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DRAWINGS ATTACHED

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(54) METALLIC-VAPOUR LAMP

(71) We, MATSUSHITA ELECTRONICS CORPORATION, a Corporation organised under the laws of Japan, of 1006, Oaza Kadoma, Kadoma-shi, Osaka, Japan, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement: —

This invention relates to metallic-vapour lamps.

Light-source devices using super high-pressure metallic-vapour lamps for example have extensive applications as point sources of light for projection purposes. They are also used for the exposure of photo-sensitive films, for example, in the manufacture of the phosphor screens of *inter alia* colour picture tubes. In these light-source devices, which are usually operated in combination with a condenser, that is a lens or system of lenses by which light is concentrated on one point or object, it is desirable that the arc in the form of a columnar light-emitting part of each light source be as small in diameter as possible; with or without the said condenser.

Further, in conventional light-source devices which makes use of an arc produced in the inside, that is to say, the hollow part of a substantially right cylindrical quartz envelope containing the super high-pressure metallic-vapour lamp as the principal light source, the diameter of the arc column appears to be comparatively large. This is because the apparent inside dimension, i.e. the diameter of the said hollow of the envelope looks larger to the eye of an observer than the actual dimension due to the refraction of the light when seen on the outside of the said envelope.

According to the present invention there is provided a metallic-vapour lamp having a substantially right cylindrical envelope and a chordal flat portion on the outside of the envelope arranged to extend parallel to the longitudinal axis of the envelope, and arranged to serve as a radiation plane, the thickness of the wall of the envelope at the chordal flat portion, excepting the longitudinal edges, being less than that of the outside curved portion of the envelope and wherein the width of the chordal flat portion is greater than the internal diameter of the envelope when viewed substantially normal to said radiation plane. Hence, the diameter of the arc column is smaller than the apparent one of conventional columns. With such a construction,—the metallic-vapour lamp of the present invention exhibits more excellent characteristics of luminance distribution than those of vapour lamps known in the prior art.

The invention will be better understood from the following description of one example shown in the accompanying drawings, in which:

Figure 1 is a side elevational view, partly in section, of a light-source device of the prior art using a conventional super high-pressure metallic vapour lamp;

Figure 2 is a sectional view taken on the section line II—II of Figure 1;

Figure 3 is a sectional view of a super high-pressure metallic vapour lamp embodying the present invention;

Figure 4 is a graph showing a comparison of the characteristics of luminance distribution of a lamp according to the invention and a conventional lamp.

Referring now specifically to the Figures, a conventional light-source device is shown in Figures 1 and 2. It is constructed with a base 1 having sockets, a super high-pressure metallic vapour lamp 2 supported by the base 1 generally parallel to the base, and a sealed envelope 3 of quartz for the lamp. The envelope 3 is formed with a substantially right cylindrical portion 4 having an inside diameter ϕ_1 of the hollow part of the envelope and an outside diameter ϕ_2, of the curved portion of the envelope so that an arc column produced in the hollow part serves as the principal light source. The apparent inside diameter ϕ_3 of the envelope 3 as viewed from the directions indicated by arrows in Figure 2 is larger than the real inside diameter ϕ_1 of the hollow part owing

[*Price 25p*]

to refraction of the light through the wall of the envelope 3. Thus the diameter of the arc column looks relatively large to the eye of an observer, than it is in reality.

By contrast, a metallic-vapour lamp of the present invention, as shown in Figure 3, has a quartz envelope 13 which is formed with a chordal flat portion 14 extending parallel to the longitudinal axis P of the envelope 13 on the outside peripheral wall surface. The chordal flat has longitudinal edges a_1 a_2. This chordal flat portion 14 constitutes a radiation plane and its width W is larger than the internal diameter ϕ_1, of the envelope when viewed normal to the said portion 14. The flat portion 14 is formed by cutting and grinding or otherwise removing glass by machining the envelope of an ordinary super high-pressure metallic-vapour lamp. Alternatively, it may be formed simultaneously with the formation of the envelope 13.

With this super high-pressure metallic-vapour lamp, the inside diameter ϕ'_3, which is viewed through and substantially normal to said chordal flat portion 14, is equal to the inside diameter ϕ_1. Therefore, the diameter of the arc column that is formed inside the envelope 13 is smaller than those of conventional super high-pressure metallic-vapour lamps. In the figures, reference letter a indicates an arc, and reference letter D represents the chordal height of the chordally extending flat portion 14.

In the light-source device of this invention, the super high-pressure metallic-vapour lamp is mounted on the base in such a manner that the flat portion 14 serves as a radiation plane. Its characteristic of luminance distribution as a percentage is compared in Figure 4 with the same characteristic as that of a conventional lamp. From the figure is can be seen that the former, represented by curve A, is more concentrated to the centre than the latter represented by a curve B. The central ordinate C represents a straight line normal to the axis P of the envelope of the lamp and which passes through the centre of the envelope. The radial distance from the envelope is plotted along the abscissa.

WHAT WE CLAIM IS:—

1. A metallic-vapour lamp having a substantially right cylindrical envelope and a chordal flat portion on the outer wall of the said envelope arranged to extend parallel to the longitudinal axis of the envelope, and arranged to serve as a radiation plane, the thickness of the wall of the envelope at the flat portion, excepting the longitudinal edges, being less than that of the outside curved portion of the envelope and wherein the width of the chordal flat portion is greater than the internal diameter of the envelope when viewed substantially normal to said radiation plane.

2. A metallic-vapour lamp as claimed in claim 1 wherein the lamp is a mercury vapour lamp in which the vapour is at a super high-pressure.

3. A metallic-vapour lamp substantially as hereinbefore described and as shown in Figure 3 of the accompanying drawings.

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2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

FIG.1
PRIOR ART

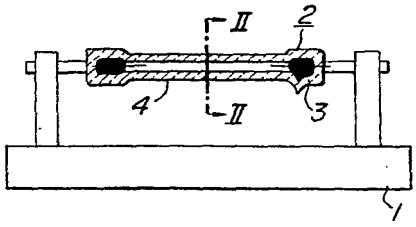

FIG.2
PRIOR ART

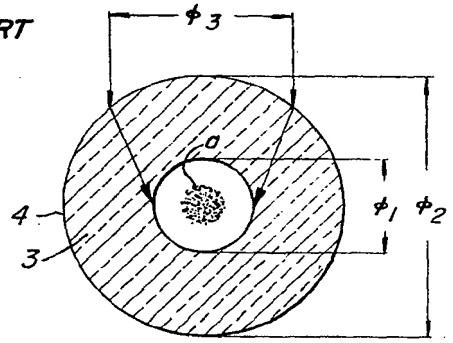

FIG.3

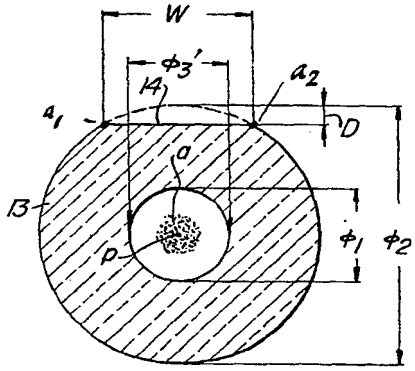

FIG. 4